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TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

INTSER P28AUS

U.S. APPLICATION NO. (for international filing only)

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INTERNATIONAL APPLICATION NO.

PCT/SE00/01764

INTERNATIONAL FILING DATE

September 13, 2000

PRIORITY DATE CLAIMED

September 15, 1999

TITLE OF INVENTION

A METHOD AND AN APPARATUS FOR IDENTIFICATION AND CONTROL OF HANDLING OF KEYS AND THE LIKE

APPLICANT(S) FOR DO/EO/US

Johnny WÄRNELÖV

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
 2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
 3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
 4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
 5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau. (PCT/IB/308 mailed 22 March 2001).
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
 6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)) is attached.
 7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
 8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
 9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
 10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).
- Items 11. to 16. below concern other document(s) or information included:
11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98 with PTO FORM 1449.
 12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
 13. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
 14. ☐ A substitute specification w/Marked-Up Version of Amended Specification.
 15. ☐ A change of power of attorney and/or address letter.
 16. ☒ Other items or information:

- ☒ Preliminary Examination Report
- ☒ Annexes to Pre. Ex. Rep.
- ☒ International Search Report
- ☐ German Novelty Search Report
- ☒ 7 copies of citations
- ☒ Form PCT/IB/308
- ☒ International Publ. No. WO 01/20413 A1

- ☒ Copy of Request
- ☒ Submission of Formal Drawings
- ☒ 3 sheets of formal drawings
- ☒ Abstract
- ☒ Applicant Claims Small Entity Status
- ☐ Copy of Notification of File Missing Parts
- ☐ German Language Specification

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Transmittal Letter and the papers indicated as being transmitted therewith is being deposited with the United States Postal Service on this date **March 7, 2002** in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EL 918840019 US** addressed to the: Box PCT, Assistant Commissioner of Patents, Arlington VA 22202-2327.

Michael J. Bujold

(typed or printed name of person mailing paper)

(signature of person mailing paper)

17. ■ The following fees are submitted:

Basic National Fee (37 CFR 1.492(a)(5):

Search Report has been prepared by the EPO or JPO \$890.00

International preliminary examination fee paid to USPTO (37 CFR 1.492)(a)(1) .. \$710.00

No international preliminary examination fee paid to USPTO (37 CFR 1.492)(a)(2)
but international search fee paid to USPTO (37 CFR 1.445(a)(2)). \$740.00

Neither international preliminary examination fee (37 CFR 1.492)(a)(3)
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$1040.00

International preliminary examination fee paid to USPTO (37 CFR 1.492)(a)(4)
and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

JC19 Rec'd PCT/P10 07 MAR 2002
CALCULATIONS PTO USE ONLY

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months
from the earliest claimed priority date (37 CFR 1.492(e)).

| Claims | Number Filed | Number Extra | Rate | | |
|--|--------------|--------------|------------|---------------------------|----|
| Total Claims | 6 - 20 = | 0 | x \$18.00 | 0 | |
| Independent Claims | 1 - 3 = | 0 | x \$84.00 | 0 | |
| Multiple dependent claim(s) (if applicable) | | | + \$280.00 | 0 | |
| TOTAL OF ABOVE CALCULATIONS = | | | | 1040 | |
| Reduction by 1/2 for filing by small entity, if applicable. Applicant Claims Small Entity Status. (Note 37 CFR 1.9, 1.27, 1.28). | | | | 520 | |
| SUBTOTAL = | | | | 520 | |
| Processing fee of \$130.00 for furnishing the English translation later the <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)). | | | | 0 | |
| TOTAL NATIONAL FEE = | | | | 0 | |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property | | | | 0 | |
| TOTAL FEES ENCLOSED = | | | | 520 | |
| | | | | Amount to be: refunded | \$ |
| | | | | charged | \$ |

a. ■ A check in the amount of \$ 520.00 to cover the above fees is enclosed.b. ☐ Please charge my Deposit Account No. 04-0213 in the amount of \$ to cover the above fees.
A duplicate copy of this sheet is enclosed.c. ■ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to
Deposit Account No. 04-0213. A duplicate copy of this sheet is enclosed.**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or
(b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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PATENT & TRADEMARK OFFICE



020210

03/07/02

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Johnny WÄRNELOV
Serial no. :
For : A METHOD AND AN APPARATUS FOR
IDENTIFICATION AND CONTROL OF
HANDLING OF KEYS AND THE LIKE
Docket : INTSER P28AUS

BOX PCT

The Commissioner of Patents and Trademarks
Washington, D.C. 20231

FIRST PRELIMINARY AMENDMENT

Dear Sir:

By way of preliminary amendment, please amend the above identified application as set forth below.

In the Specification:

Please cancel paragraphs 2, 3, 4, 11, 12, 19 of the specification, in their entirety, in favor of a clean form of paragraphs 2, 3, 4, 11, 12, 19 of the specification, without any markings thereon, as follows. Accompanying this response is a copy of the original paragraphs of the specification which show the addition(s) (by underlining, highlighting and bold) and the deletion(s) (by strikeout) to the canceled specification paragraphs. Please enter the replacement specification paragraphs into the record of this case.

In the Claims:

Please cancel claims 1-10, without prejudice or disclaimer of the subject matter therein, in favor of new claims 11-16 as follows.

[002] FIELD OF THE INVENTION

[003] The present invention relates to a method for identification and control of the handling of keys and the like. The invention also relates to an apparatus for carrying out the method.

[004] SUMMARY OF THE INVENTION

[011] BRIEF DESCRIPTION OF THE DRAWINGS

[012] The invention will now be described, by way of example, with reference to the accompanying drawings in which:

[019] DETAILED DESCRIPTION OF THE INVENTION

11. (NEW) A method of identification and control of handling of keys, the method comprising the steps of:

associating each key with an identification and control device (3);

which is used with a pin-like, hollow shell (26), in which a printed circuit card (42) and a chip (43) are mounted, and loading the chip (43) with a unique code for each identification and control device (3), and

which is inserted into a hole (23) in the local control unit (2),

which is connected to a control center (4),

into which an identification code of the user being fed;

with transmission of the code to the unit (2),

from the printed circuit card (42) and the chip (43) of the device (3) and via contact means (19) information is sent to the printed circuit card (18) of the local control and indication unit (2), and

in which control center (4) and unit (2), respectively, removability and reinsertion, respectively, of each control device (39) are registered and indicated, respectively,

the control and indication unit (2) is mounted in a key cabinet or the like, locked by a code lock,

into which a personal code is fed by the user in order to be able to open the cabinet,

in addition to a release of the door to the key cabinet or the like, a signal to the printed circuit card (18) of the unit (2) being forwarded, for each insertion position (23) for an identification and control device (3) authorization and/or non-authorization being indicated, particularly by a diode lamp (25) showing a green light for authorization and a red light for non-authorization,

when one or several keys are removed with authorization, a signal is sent via the printed circuit card (18) of the unit (2) to the control center (4) having a central printed circuit card, in which the removal is registered and stored,

when a removal without authorization is done, an alarm signal in a similar way is sent to the center and forwarded to e.g. an alarm device,

up to the return of the key/the keys or the like, it/they and/or the attached identification and control device (3), when e.g. a door is unlocked, will send a signal, which is registered in the center and/or another center,

when the key/the keys or the like is (are) returned, associated diodes will emit light, when the user has given his code, in order to indicate, where the key/the keys is (are) to be inserted, which also will be registered in the center,

via any of the centers, possibly via a connected PC, in each phase it is possible to control, who has removed which keys, and possibly also to determine the point of time for a removal, an unlocking, a locking, a return etc., preferably also security functions being integrated, e.g. a return of keys before a certain specified point of time.

12. (NEW) An apparatus (1) for carrying out the method for identification and control of handling of keys according to claim 11, wherein

each key or the like is associated to an identification and control device (3),

which is used with a pin-like, hollow shell (26), in which a printed circuit card (42) and a chip (43) are mounted, the latter being loaded with a unique code for each identification and control device (3), and

which is inserted into a hole (23) in the local control unit (2),

which is connected to a control center (4),

into which an identification code of the user being fed

with transmission of the code to the unit (2),

from the printed circuit card (42) and the chip (43) of the device (3) and via contact means (19) information is sent to the printed circuit card (18) of the local control and indication unit (2), and

in which control center (4) and unit (2), respectively, removability and reinsertion, respectively, of each control device (39) are registered and indicated, respectively,

the control and indication unit (2) is mounted in a key cabinet or the like, locked by a code lock,

Into which a personal code is fed by the user in order to be able to open the cabinet,

in addition to a release of the door to the key cabinet or the like, a signal to the printed circuit card (18) of the unit (2) being forwarded, for each insertion position (23) for an identification and control device (3) authorization and/or non-authorization being indicated, particularly by a diode lamp (25) showing a green light for authorization and a red light for non-authorization,

when one or several keys are removed with authorization, a signal is sent via the printed circuit card (18) of the unit (2) to the control center (4) having a central printed circuit card, in which the removal is registered and stored,

when a removal without authorization is done, an alarm signal in a similar way is sent to the center and forwarded to e.g. an alarm device,

up to the return of the key/the keys or the like, it/they and/or the attached identification and control device (3), when e.g. a door is unlocked, will send a signal, which is registered in the center and/or another center,

when the key/the keys or the like is (are) returned, associated diodes will emit light, when the user has given his code, in order to indicate, where the key/the keys is (are) to be inserted, which also will be registered in the center,

via any of the centers, possibly via a connected PC, in each phase it is possible to control, who has removed which keys, and possibly also to determine the point of time for a removal, an unlocking, a locking, a return etc., preferably also security functions being integrated, e.g. a return of keys before a certain specified point of time.

13. (NEW) The apparatus according to claim 12, wherein the control and indication unit (2) preferably is designed as a strip for a plurality of identification and control devices (3), which have a fastener (29) at their end for one or several keys, in that the unit (2) comprises a frame work (5), U-shaped in cross-section and preferably made of metal sheet, in which the longitudinal edges of the legs (11, 13) end in narrow flanges (6), extending in opposite directions in relation to each other and having a few additional projecting eyes (7), designed to receive screws or the like for the fastening of the unit to a wall, in that in the U-profile a fastening profile (8) is inserted having the same length, in that the substantially L-shaped fastening profile has a base leg (9), which lies in the same plane as the flanges (6), to the free longitudinal edge of this leg a bearing leg (10), which is shorted in profile, being connected, designed to abut the

inner side of one of the legs (11) of the frame work, in that the second leg (12) of the fastening profile (8) runs plane parallel to the second leg (13) of the frame work at a distance inside it, and in that bolts (15) extend through the front (14) of the frame work (5) and the base leg (9) and are provided with spacing sleeves (16), which fasten these two parts to each other to a manageable unit.

14. (NEW) The apparatus according to claim 13, wherein the leg (12) of the fastening profile (8) via fastening means (17) supports a printed circuit card (18), on its side, which faces the leg (11) of the frame work, contact means (19) extending from the printed circuit card towards the leg of the frame work and comprising a ribbon, plane parallelly disposed in relation to the front (14) of the frame work, the ribbon comprising electric cables, separated from each other, one for each identification and control device (3), and in that the base leg (9) of the fastening profile supports with its side, which faces the front of the frame work, via fastening means (20) a fastener (21) for permanent magnets (22), which project towards the front of the frame work, one for each identification and control device.

15. (NEW) The apparatus according to claim 14, wherein the front of the frame work has a plurality of holes (23), which correspond to the number of identification and control devices (3), suitably having inwardly bent collars (24), designed to have a guiding effect, in that the front of the frame work is provided with diode lamps (25), connected to the printed circuit card (18) and associated with the holes and designed to indicate e.g. authorization and non-authorization, when an identification and control device (3) has been fully inserted.

16. (NEW) The apparatus according to claim 12, wherein the pin-like shell (26) of the identification and control devices (3) is made of a light metal, the outer end (27) of the shell (26) preferably being pointed like a wedge and provided with a through hole (28) across it, designed to receive a key ring (29), to which one or several keys can be fastened, in that the shell (26) comprises two parts, a front inner part (30) and a rear outer part (31), in that the end sides (32, 33) of the two parts, designed in this way, which end sides face each other, each are provided with a cylindrical recess (34 and 35, respectively), designed to receive a carrier (63) made of an electrically isolating material, e.g. a plastic material, in that the carrier has a substantially cylindrical shape and fits with press fit with the respective ends into a respective recess, cavities (37

and 38, respectively) being left, designed to receive e.g. screw-shaped electrically conductive compression springs (39, 40), in that around the center of the shell a flange (41) extends, which separated the ends of the parts (30, 31) from each other and consequently is an electrically isolating flange, in that a compression spring abuts each end of the printed circuit card (42) with one of its ends, the other end of the compression springs abutting the respective bottom of the recesses (34, 35), and in that the end of each device (3), which is the front end in the insertion direction, receives in a recess (44) a steel washer (45), designed to cooperate with one of the permanent magnets via the ribbon (19) and an electric cable in it.

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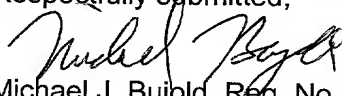
REMARKS

The above newly entered paragraph(s) and the accompanying marked-up paragraph(s) of the specification overcome some informalities noted in the specification on file. The undersigned avers that the newly entered replacement paragraph(s) of the specification do not contain any new subject matter.

Please consider newly entered claims 11-16 upon substantive consideration of this application.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



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[001] A METHOD AND AN APPARATUS FOR IDENTIFICATION AND
CONTROL OF HANDLING OF KEYS AND THE LIKE

[002] **FIELD OF THE INVENTION**

[003] The present invention relates to a method for identification and control of the handling of keys and the like ~~according to the preamble of claim 1~~. The invention also relates to an apparatus for carrying out the method ~~set forth in claim 4 according to the preamble of the first apparatus claim~~.

[004] **SUMMARY OF THE INVENTION**

[005] In e.g. offices, factories, hospitals, hotels, security companies, car repair shops and car rental services, mail-carrying companies, shipping agencies, banks, apartment buildings, real estate companies etc usually a relatively large number of keys for various properties, apartments, rooms, file cabinets, safe-deposit boxes, cars etc are circulated. The keys are used by a fairly large group of people and so far it has been difficult or impossible to e.g. keep track of the whereabouts of certain keys/persons at certain points of time. Mistakes and neglects can easily occur, when the key cabinet is used and also when keys are manually handed out and this is registered. Also, all personal handling is very time consuming and expensive.

[006] In order to avoid to a large extent the last mentioned drawbacks electronic circuitries including IC-circuits have already been used, which can identify certain used codes, which are associated with a loose object. However, partly the design of these electronic circuitries is imperfect and limited and partly their applications are defective and impractical, and consequently e.g. the security cannot be guaranteed and a reliable survey of the situation is lacking.

[007] US-A-4 549 170 relates to a system for handling a key panel. The panel is designed for a very large number of, namely one thousand, keys, which mutually can and presumably should vary rather strongly (see Figs 1 and 2). Each key with its special design will be used in a particular corresponding special opening having a fitting module in said panel (see column 3, lines 9-15).

[008] This may cause a difficult search, in case corresponding numbers are not available. The keys are completely conventional but designed to, when they have

[011] **BRIEF DESCRIPTION OF THE DRAWINGS**

[012] ~~Additional characterizing features and advantages of the invention are set forth in the following description, reference being made to the enclosed drawings, which show a few preferred but not limiting embodiments. The drawings show in detail in~~

[012] **The invention will now be described, by way of example, with reference to the accompanying drawings in which:**

[013] Fig. 1 is an apparatus according to the invention with a perspective view from one end, from above and from the front, of a control and indication unit;

[014] Fig. 2 is a perspective view of the outer end of an identification and control device, which is a part of the apparatus according to Fig. 1;

[015] Fig. 3 is a diametrical longitudinal section through the device according to Fig.2;

[016] Fig. 4 is the unit according to Fig. 1 in an end view from the left in Fig. 1;

[017] Fig. 5 is a diametrical cross-section of the unit according to Fig. 1; and

[018] Fig. 6 is a view of a modified apparatus, which is similar to the apparatus shown in Fig. 4.

[019] **DETAILED DESCRIPTION OF THE INVENTION**

[020] An apparatus 1 according to the invention is shown in its entirety. It comprises three main components, namely at least one control and indication unit 2, a plurality of identification and control devices 3, designed for unit 2 as well as a control center 4. Said unit is shown in the drawings as a strip for 14 pin-shaped identification and control devices. The shown strip shape is only one example, which can be replaced by any other suitable shape, e.g. the rear or interior side of a key cabinet. The pin shape of said device is also only an example, which can be replaced by any other suitable shape. The number of units and devices can vary within certain limits. Also, more than one center can be used.

[021] Strip 2 comprises a frame work with a U-shaped cross-section made of metal sheet, the free longitudinal edges of legs 11,13 of which end in away from

Rec'd PCT/PTO 07 MAR 2002

A METHOD AND AN APPARATUS FOR IDENTIFICATION AND CONTROL OF
HANDLING OF KEYS AND THE LIKE

5 The present invention relates to a method for identification and control of the handling of keys and the like according to the preamble of claim 1. The invention also relates to an apparatus for carrying out the method set forth in claim 1 according to the preamble of the first apparatus claim.

10 In e.g. offices, factories, hospitals, hotels, security companies, car repair shops and car rental services, mail-carrying companies, shipping agencies, banks, apartment buildings, real estate companies etc usually a relatively large number of keys for various properties, apartments, rooms, file cabinets, safe-deposit boxes, cars etc are circulated. The keys are used by a fairly large group of people and so far it has been difficult or impossible to e.g. keep track of the whereabouts of certain keys/per-
15 sons at certain points of time. Mistakes and neglects can easily occur, when the key cabinet is used and also when keys are manually handed out and this is registered. Also, all personal handling is very time consuming and expensive.

20 In order to avoid to a large extent the last-mentioned drawbacks electronic circuitries including IC-circuits have already been used, which can identify certain used codes, which are associated with a loose object. However, partly the design of these electronic circuitries is imperfect and limited and partly their applications are defective and impractical, and consequently e.g. the security cannot be guaranteed and a reliable survey of the situation is lacking.

25 US-A-4 549 170 relates to a system for handling a key panel. The panel is designed for a very large number of, namely one thousand, keys, which mutually can and presumably should vary rather strongly (see Figs 1 and 2). Each key with its special design will be used in a particular corresponding special opening having a fitting module in said panel (see column 3, lines 9-15).

30 This may cause a difficult searching, in case corresponding numberings are not available. The keys are completely conventional but designed to, when they have been inserted into the panel, trigger an electric contact via their handle or tip or point. A wrong key can of course be inserted into a panel opening, but only if the shape of the opening in depth allows this. The triggered contact is forwarded to an electronic system for various indications. However, the keys are per se not designed to forward any special information from the user or in a reliable way from themselves for the above-mentioned reason. The system must in all likelihood on every occasion be composed in a special
35 way, and quite likely often be recomposed, since locks and keys often are exchanged for other locks

and keys. This makes the system not very suitable for a practical usefulness and at least makes it most detailed, inflexible and expensive in manufacturing and maintenance situations.

5 The object of the present invention is to provide a method of counteracting and to the utmost possible extent eliminate these drawbacks as well as to in various additional respects enhance the state of the art in this field.

10 These objects are attained according to the present invention by carrying out a method of the kind mentioned in the introduction mainly as set forth in the characterizing clause of claim 1. Said objects are also attained by designing an apparatus of the kind mentioned in the introduction mainly in the way set forth in the characterizing clause of the first apparatus claim. Thanks to the invention a robust but still highly sophisticated and completely reliable method of handling , with the greatest imaginary carefulness and reliability , an arbitrary number of keys has been developed. By means of their pin-like shape the identification and control devices protect their sensitive contents to a great extent. Thus, they can be subjected to a rough treatment for an extended time without this having a damaging effect on their functioning. The pin-shape is flexible in all respects and not bulky nor heavy. At the same time the pin-shape allows to a large extent a protection of the sensitive parts of a local control unit, since these parts are mounted in a careful way within said unit and are concealed and protected. Despite the fact, that thousands or many thousands of different codes can be stored in the pins, they are uniform and thus, they do not cause any problems, when keys, users, storage spaces etc. are exchanged.

25 Additional characterizing features and advantages of the invention are set forth in the following description, reference being made to the enclosed drawings, which show a few preferred but not limiting embodiments. The drawings show in detail in:

Fig. 1 an apparatus according to the invention with a perspective view from one end, from above and from the front , of a control and indication unit;

30 Fig. 2 a perspective view of the outer end of an identification and control device, which is a part of the apparatus according to Fig. 1;

Fig. 3 a diametrical longitudinal section through the device according to Fig.2;

Fig. 4 the unit according to Fig. 1 in an end view from the left in Fig 1;

Fig. 5 a diametrical cross-section of the unit according to Fig. 1; and

Fig. 6 a view of a modified apparatus, which is similar to the apparatus shown in Fig. 4.

An apparatus 1 according to the invention is shown in its entirety. It comprises three main components, namely at least one control and indication unit 2, a plurality of identification and control devices 3, designed for unit 2 as well as a control center 4. Said unit is shown in the drawings as a strip for 14 pin-shaped identification and control devices. The shown strip shape is only one example, which can be replaced by any other suitable shape, e.g. the rear or interior side of a key cabinet. The pin shape of said device is also only an example, which can be replaced by any other suitable shape. The number of units and devices can vary within certain limits. Also, more than one center can be used.

Strip 2 comprises a frame work with a U-shaped cross-section made of metal sheet, the free longitudinal edges of legs 11,13 of which end in away from each other directed narrow flanges 6 having a few further outstanding eye fastening means 7, designed to receive screws (not shown) for the fastening of the strip to a wall.

A fastening profile 8 is inserted into the U-profile and has the same longitudinal extension. The fastening profile, which is substantially L-shaped, has a base leg 9, which lies in the same plane as flanges 6, a bearing leg 10, short in profile, being connected to the free longitudinal edge of base leg 9 and designed to bear on the interior side of first leg 11 and the frame work. Second leg 12 of fastening profile 8 runs parallel to second leg 13 of the frame work at a distance inside the same.

Bolts 15 extend through front side 14 of frame work 5 and base leg 9, spacing sleeves 16 connecting these two parts to each other to obtain a manageable unit.

Leg 12 of fastening profile 8 carries via fastening means 17 a printed circuit card 18 on its side, which faces leg 11 and the frame work, from which circuit card a contact means 19 projects towards said leg of the frame work, designed as a ribbon, which is parallel to front 14 of the frame work and comprises electric cables, separated from each other (not shown), one cable for each identification and control device. For the rest the electric circuit suitably is closed to printed circuit card 18 via frame work 5, which that portion of device 3 contacts, which is electrically isolated from another portion of device 3, which can be electrically contacted with contact means 19. Printed circuit card 18 is via a signaling circuit 46 connected to a center 4 and a local PC, a display unit or the like respectively, which in its turn is connected to center 4.

Base leg 9 of the fastening profile carries via fastening means 20 by means of its side, which faces the front of the frame work, a fastener 21 for permanent magnets 22, which project towards the front of the frame work, one for each identification and control device.

The front of the frame work has a number of holes 23, which correspond to said number of identification and control devices 3, suitably having inwardly bent collars 24, designed to provide a guide effect. Also, the front of the frame work is provided with diode lamps 25, connected to printed circuit card 18, fitted into said holes and designed to indicate e.g. an authorization and a non-authorization respectively, when an identification and control device 3 has been fully inserted. Non-authorization or non-availability can be indicated by a red light, whereas authorization or availability can be shown by a green light. Many different possibilities and combinations are of course possible, which hardly need any description in more detail.

In a preferred embodiment an identification and control device 3 according to the invention comprises a pin-like shell 26, e.g. made of a light metal. One end 27, the exterior one, of shell 26 can be pointed like a wedge and provided with a hole 28 right through it, for receiving a key-ring 29, to which a key (not shown) is to be fastened.

Sheet 26 comprises two parts, one front (inner part) 30 and one rear (outer) part 31. End sides 32, 33, facing each other, of the two parts formed in this way, are each provided with a cylindrical recess 34 and 35 respectively for receiving a carrier 36 made of an electrically isolating material, e.g. a plastic material. The carrier substantially has a cylindrical shape and fits with press fit with each end into a respective recess, a cavity 37 and 38 respectively remaining, designed to receive e.g. screw-shaped electrically conductive compression springs 39, 40. Around the central part of the shell a flange 41 extends, which separates the ends of said parts 30, 31 from each other and consequently is electrically isolating, whereas the axially hollow shell receives a printed circuit card 42 and a chip 43, which is loaded with a unique code for each identification and control device. A compression spring with its one end abuts each end of said printed circuit card 42, whereas the other end of the compression springs is supported by the respective bottom of said recesses 34, 35. Finally the end of each device 3, which is the front end in the insertion direction, receives in a recess 44 a steel washer 45, designed to cooperate with one of said permanent magnets via said ribbon 19 and an electric cable in it.

Such an apparatus according to the invention will function in the following fashion: In a typical case a control and indication unit (the strip) 2 is mounted in a key cabinet (not shown), locked by means of a code lock, in which a user inserts his code in order to open the cabinet. When the code is inserted, a signal transfer to printed circuit card 18 in addition to a release of the key cabinet door takes place, for each insertion place 23 for an identification and control device (the pin) 3, an authorization and/or a non-authorization being indicated, e.g. by means of a green illumination of a diode lamp 25 for an authorization, whereas for a non-authorization a red illumination of the diode

lamp is used. When one or several keys are removed in a proper way, a signal is transferred via printed circuit card 18 of the strip to said control center 4 having a central printed circuit card, in which the removal is registered and stored. When a removal takes place in an improper way, an alarm signal is transferred in a similar way to said center and forwarded to e.g. an alarm device.

5

Up to the return of the key/the keys it/they and/or the attached pin(s), when e.g. a door is unlocked, can send a signal, which is registered in said center and/or another center.

When the key/the keys are returned, the respective diodes emit light, when the user has inserted his code, and indicate, where the key/the keys is (are) to be inserted, which also is registered in said center.

Via any of said centers, possibly via a connected PC, the user will in each phase be able to see, who has removed which keys and possibly also the point of time of removal, unlocking, locking, return etc. Also, security functions can be integrated, e.g. the return of keys before a certain point of time.

The apparatus shown in Fig. 6 differs from the apparatus shown in Fig. 4 and 5 respectively solely regarding the signal transfer. Permanent magnet 22' is in this case, by means of fastening means 20' and a fastener 21', e.g. a bolt and a nut, fastened to printed circuit card 18, device 3 with its insertion end directly abutting the magnet and the information being transferred from device 3 to circuit card 18. In this case magnet 22' has a double function, namely partly, like before, to secure the correct insertion position of the device by attracting the same, and partly to take over the function as electric contact means of means 19. Device 3 suitably comprises two metal parts, e.g. a front part made of steel and a rear part made of a lighter metal. Via hole 23 and control collar 24 respectively, in which the material jointly with the rest of the shell also is made of an electric conductive material, e.g. metal, the rear end of device 3 is grounded. As an alternative to this grounding it is possible to let some type of spring radially abut the rear portion of device 3. Collar 24 can, particularly in the latter case, be made of a plastic material. Device 3 can also entirely or partially be made of a plastic material, e.g. a plastic material having conductive portions.

The apparatus according to the invention suitably is provided with a special computer program, which also comprises the possibility of successively adding one or more additional strips or the like to a suitable number of insertion positions. The apparatus, the method and also said computer program allow a mounting of devices 3 in "stationary" or changeable positions. In the latter case device 3 can be inserted into an arbitrary hole 23. Thanks to printed circuit card 42 of device 3 and chip 43 it is easy for control center 4 to recognize each device 3 as a unique part and to indicate its

possibly changed position. In case a programming has been done for "stationary" positions and device 3 still is mounted in a position other than the indicated position, the local and/or the central electronic circuitry can indicate the changed position by means of a short buzzer signal. In case still no repositioning of device 3 takes place, its actual position will be registered and it will be indicated at the next inquiry opportunity, i.a. by means of diode lamp 25. In case the user takes the wrong device 3/key, i.e. a device, for which the code and the ID of the user is not programmed, the device will issue an alarm signal, preferably initially a "small" alarm signal during a few seconds, in order to allow the user to understand his mistake and reposition device 3, and after e.g. 10 seconds a "big" alarm signal. According to a preferred embodiment a locked cabinet (not shown) is provided with a code lock and a display (not shown). After writing the correct code the cabinet can be opened. The user can now choose the desired key (one at a time). The keys are, when registered, provided with a name and/or a number. After the writing of a key name and a number respectively diode lamp 25 flashes close to the chosen device 3 with the chosen key. In case the desired key already has been removed by another user (empty key position), the user is able to be informed in the display window about who has removed the key. The key positions can be made visible on a PC, which belongs to or is connected to unit 2 and 4 respectively. The user can open a window in order to see the key positions visually. By moving the mouse to an empty key position and clicking the mouse, the user is able to obtain information about who has removed the key and the point of time this occurred.

The present invention is not limited to the embodiments described above and shown in the drawings respectively, which only are to be regarded as exemplifying embodiments, which can be modified and supplemented in an arbitrary way within the scope of the inventive idea and the accompanying claims. The handling can relate to other items than keys, e.g. tools, documents, medical drugs etc. The characterizing features of the various embodiments or parts thereof can of course be mutually exchanged. The identification and control devices can of course be sealed or be protected in other ways against trespassing. The keys, i.e. the key rings and the like, can also be included in such a protection. In very special cases the pins can be designed as a part of a key.

CLAIMS

1. A method of identification and control of handling of keys and the like, wherein

- each key or the like is associated to an identification and control device (3),

5 - which is used with a pin-like, hollow shell (26), in which a printed circuit card (42) and a chip (43) are mounted, the latter being loaded with a unique code for each identification and control device (3),

- and which is inserted into a hole (23) in said local control unit (2),

- which is connected to a control center (4),

10 - into which an identification code of the user being fed

- with transmission of said code to said unit (2),

- from the printed circuit card (42) and the chip (43) of said device (3) and via contact means (19) information is sent to the printed circuit card (18) of the local control and indication unit (2),

15 - and in which control center (4) and unit (2), respectively, removability and reinsertion, respectively, of each control device (3) are registered and indicated, respectively,

- the control and indication unit (2) is mounted in a key cabinet or the like, locked by a code lock,

- into which a personal code is fed by the user in order to be able to open the cabinet,

20 - in addition to a release of the door to the key cabinet or the like, a signal to the printed circuit card (18) of the unit (2) being forwarded, for each insertion position (23) for an identification and control device (3) authorization and/or non-authorization being indicated, particularly by a diode lamp (25) showing a green light for authorization and a red light for non-authorization,

- when one or several keys are removed with authorization, a signal is sent via the printed circuit card (18) of the unit (2) to said control center (4) having a central printed circuit card, in which the removal is registered and stored,

25 - when a removal without authorization is done, an alarm signal in a similar way is sent to said center and forwarded to e.g. an alarm device,

- up to the return of the key/the keys or the like, it/they and/or the attached identification and control device (3), when e.g. a door is unlocked, will send a signal, which is registered in said center and/or another center,

30 - when the key/the keys or the like is (are) returned, associated diodes will emit light, when the user has given his code, in order to indicate, where the key/the keys is (are) to be inserted, which also will be registered in said center,

35 - via any of said centers, possibly via a connected PC, in each phase it is possible to control, who has removed which keys, and possibly also to determine the point of time for a removal, an unlocking, a locking, a return etc., preferably also security functions being integrated, e.g. a return of keys before a certain specified point of time.

AMENDED SHEET

2. An apparatus (1) for carrying out the method for identification and control of handling of keys or the like according to claim 1, wherein

- each key or the like is associated to an identification and control device (3),
- which is used with a pin-like, hollow shell (26), in which a printed circuit card (42) and a chip (43) are mounted, the latter being loaded with a unique code for each identification and control device (3),
- and which is inserted into a hole (23) in said local control unit (2),
- which is connected to a control center (4),
- into which an identification code of the user being fed
- with transmission of said code to said unit (2),
- from the printed circuit card (42) and the chip (43) of said device (3) and via contact means (19) information is sent to the printed circuit card (18) of the local control and indication unit (2),
- and in which control center (4) and unit (2), respectively, removability and reinsertion, respectively, of each control device (3) are registered and indicated, respectively,
- the control and indication unit (2) is mounted in a key cabinet or the like, locked by a code lock,
- into which a personal code is fed by the user in order to be able to open the cabinet,
- in addition to a release of the door to the key cabinet or the like, a signal to the printed circuit card (18) of the unit (2) being forwarded, for each insertion position (23) for an identification and control device (3) authorization and/or non-authorization being indicated, particularly by a diode lamp (25) showing a green light for authorization and a red light for non-authorization,
- when one or several keys are removed with authorization, a signal is sent via the printed circuit card (18) of the unit (2) to said control center (4) having a central printed circuit card, in which the removal is registered and stored,
- when a removal without authorization is done, an alarm signal in a similar way is sent to said center and forwarded to e.g. an alarm device,
- up to the return of the key/the keys or the like, it/they and/or the attached identification and control device (3), when e.g. a door is unlocked, will send a signal, which is registered in said center and/or another center,
- when the key/the keys or the like is (are) returned, associated diodes will emit light, when the user has given his code, in order to indicate, where the key/the keys is (are) to be inserted, which also will be registered in said center,
- via any of said centers, possibly via a connected PC, in each phase it is possible to control, who has removed which keys, and possibly also to determine the point of time for a removal, an unlocking, a locking, a return etc., preferably also security functions being integrated, e.g. a return of keys before a certain specified point of time.

AMENDED SHEET

3. An apparatus according to claim 2, **characterized in that** said control and indication unit (2) preferably is designed as a strip for a plurality of identification and control devices (3), which have a fastener (29) at their end for one or several keys, in that said unit (2) comprises a frame work (5), U-shaped in cross-section and preferably made of metal sheet, in which the longitudinal edges of the legs (11, 13) end in narrow flanges (6), extending in opposite directions in relation to each other and having a few additional projecting eyes (7), designed to receive screws or the like for the fastening of the unit to a wall, in that in the U-profile a fastening profile (8) is inserted having the same length, in that the substantially L-shaped fastening profile has a base leg (9), which lies in the same plane as the flanges (6), to the free longitudinal edge of this leg a bearing leg (10), which is shorter in profile, being connected, designed to abut the inner side of one of the legs (11) of the frame work, in that the second leg (12) of the fastening profile (8) runs plane parallel to the second leg (13) of the frame work at a distance inside it, and in that bolts (15) extend through the front (14) of the frame work (5) and the base leg (9) and are provided with spacing sleeves (16), which fasten these two parts to each other to a manageable unit.

4. An apparatus according to claim 3, **characterized in that** the leg (12) of the fastening profile (8) via fastening means (17) supports a printed circuit card (18), on its side, which faces the leg (11) of the frame work, contact means (19) extending from the printed circuit card towards said leg of the frame work and comprising a ribbon, plane parallelly disposed in relation to the front (14) of the frame work, said ribbon comprising electric cables, separated from each other, one for each identification and control device (3), and in that the base leg (9) of the fastening profile supports with its side, which faces the front of the frame work, via fastening means (20) a fastener (21) for permanent magnets (22), which project towards the front of the frame work, one for each identification and control device.

5. An apparatus according to claim 4, **characterized in that** the front of the frame work has a plurality of holes (23), which correspond to said number of identification and control devices (3), suitably having inwardly bent collars (24), designed to have a guiding effect, in that the front of the frame work is provided with diode lamps (25), connected to said printed circuit card (18) and associated with said holes and designed to indicate e.g. authorization and non-authorization, when an identification and control device (3) has been fully inserted.

6. An apparatus according to any of claims 2-5, **characterized in that** the pin-like shell (26) of said identification and control devices (3) is made of a light metal, the outer end (27) of the shell (26) preferably being pointed like a wedge and provided with a through hole (28) across it, designed to receive a key ring (29), to which one or several keys can be fastened, in that the shell

(26) comprises two parts, a front inner part (30) and a rear outer part (31), in that the end sides (32, 33) of the two parts, designed in this way, which end sides face each other, each are provided with a cylindrical recess (34 and 35, respectively), designed to receive a carrier (63) made of an electrically isolating material, e.g. a plastic material, in that the carrier has a substantially cylindrical shape and fits with press fit with the respective ends into a respective recess, cavities (37 and 38, respectively) being left, designed to receive e.g. screw-shaped electrically conductive compression springs (39, 40), in that around the center of the shell a flange (41) extends, which separates the ends of said parts (30, 31) from each other and consequently is an electrically isolating flange, in that a compression spring abuts each end of said printed circuit card (42) with one of its ends, the other end of the compression springs abutting the respective bottom of said recesses (34, 35), and in that the end of each device (3), which is the front end in the insertion direction, receives in a recess (44) a steel washer (45), designed to cooperate with one of said permanent magnets via said ribbon (19) and an electric cable in it.

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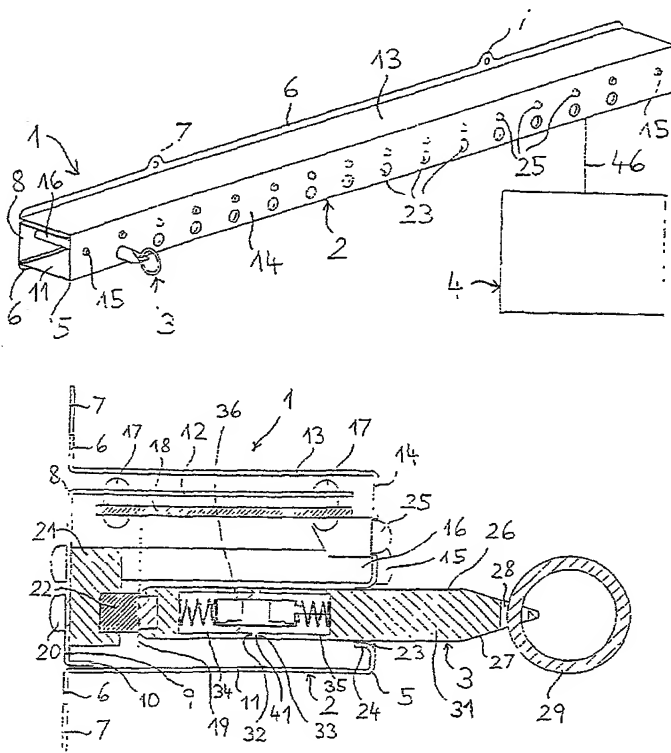
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[Continued on next page]

(54) Title: A METHOD AND AN APPARATUS FOR IDENTIFICATION AND CONTROL OF HANDLING OF KEYS AND THE LIKE



(57) Abstract: The present invention relates to a method and an apparatus for identification and control of the handling of keys, for each key an identification and control device (3) being selected, which will be registered, when a removal and a return respectively will be carried out. According to the invention the identification code of the user is fed into a control center (4) and the fed code is forwarded to a printed circuit card (18) in a local control and indication unit (2), and the removability and the removal in said control center (4) is registered and indicated on said control and indication unit (2), an identification and control device (3) being used, which has a pin-like, hollow shell (26) with a printed circuit card (42) and a chip (43), the latter being loaded with a unique code for each identification and control device (3), and which is inserted into a hole (23) in said local control and indication unit (2), from the printed circuit card (42) and the chip (43) of the device (3) and through contact means (19) information being forwarded to the printed circuit card (18) of the local control and indication unit (2).

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LIST OF TERMS IN THE DESCRIPTION

1. apparatus according to the invention
2. control and indication unit
- 5 3. identification and control device
4. control center
5. strip frame work
6. flanges
7. eye fastening means
- 10 8. fastening profile
9. base leg
10. bearing leg
11. first leg of the frame work
12. second leg of the fastening profile
- 15 13. second leg of the frame work
14. front of frame work
15. bolts
16. spacing sleeves
17. fastening means
- 20 18. printed circuit card in the strip
19. contact means
20. fastening means
21. fastener
22. permanent magnets
- 25 23. hole
24. collars
25. diode lamps
26. shell device
27. first end of device
- 30 28. hole
29. key-ring
30. front part of shell
31. rear part of shell
32. end side
- 35 33. end side
34. cylindrical recess

35. cylindrical recess
36. carrier
37. cavity
38. cavity
39. compression spring
40. compression spring
41. flange
42. printed circuit card
43. chip
44. recess
45. steel washer
46. signalling circuit

10

15

100

2000

100

12

1/3

FIG 1

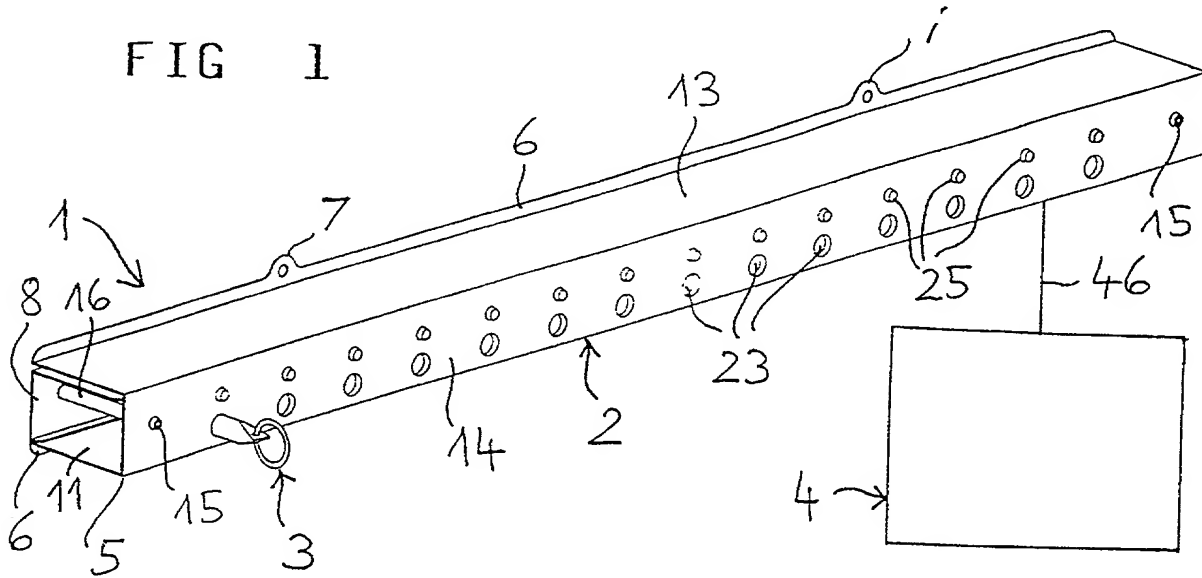


FIG 2

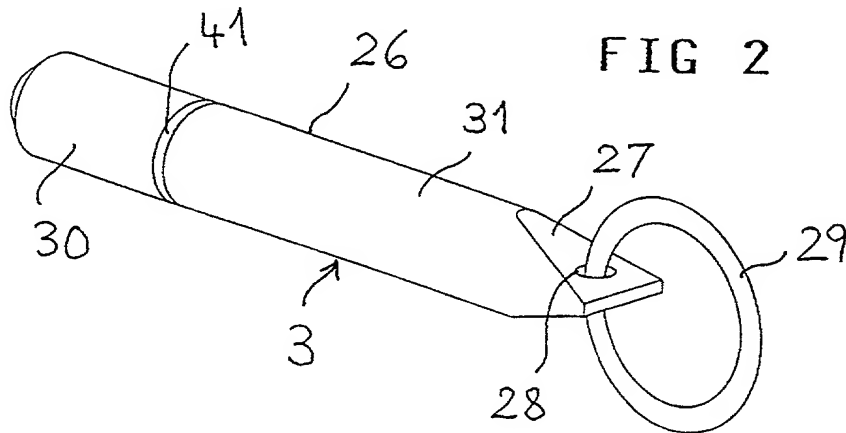
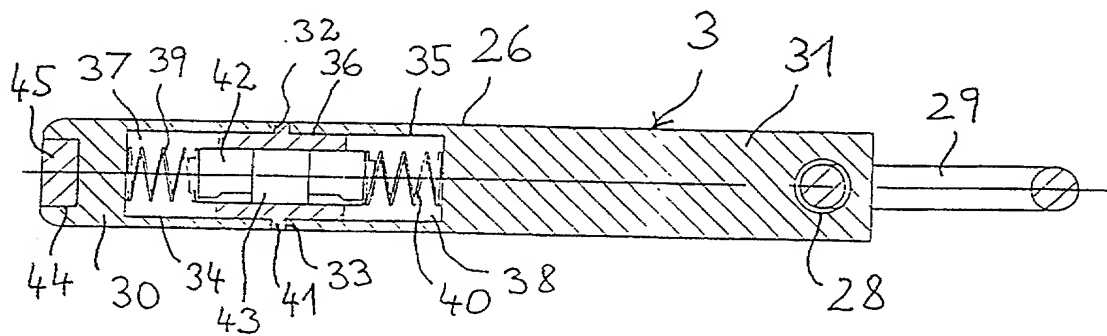


FIG 3



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FIG 4

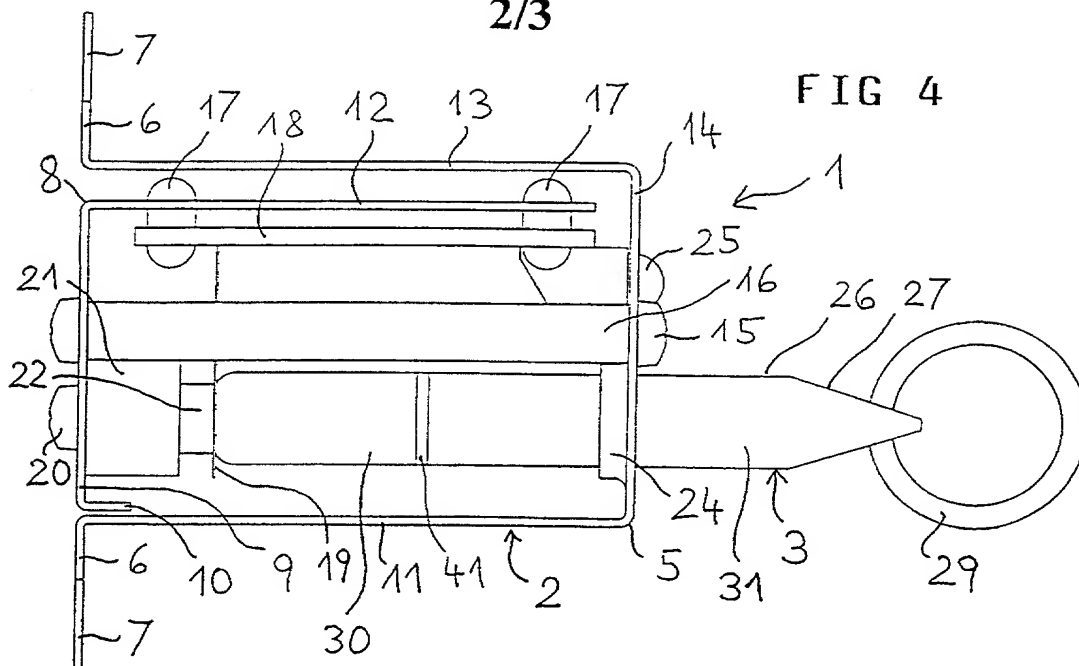
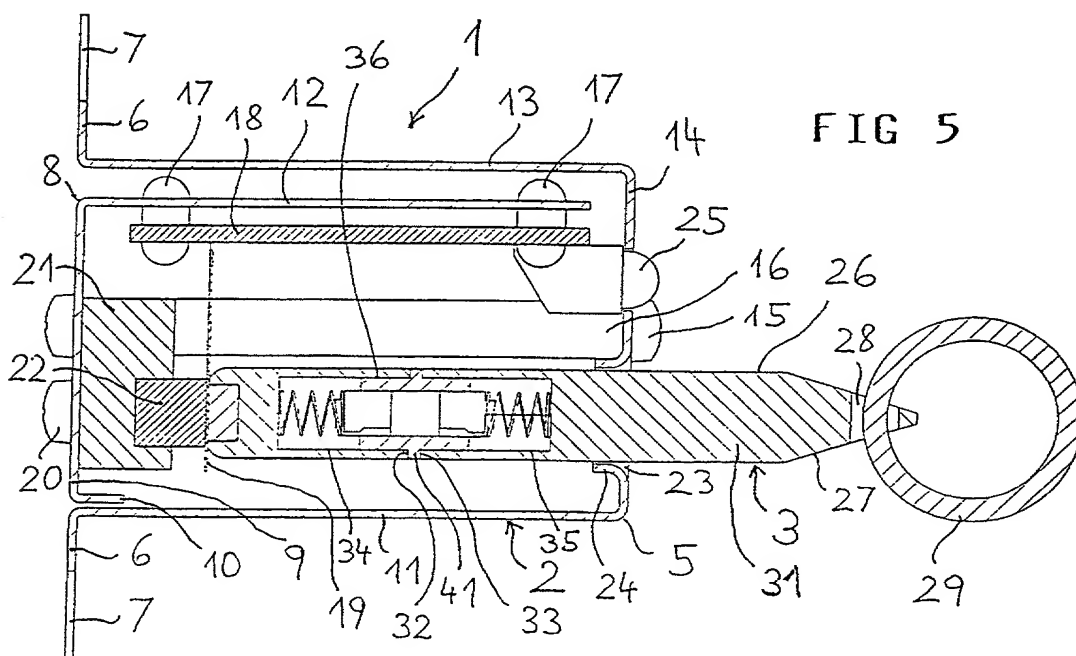
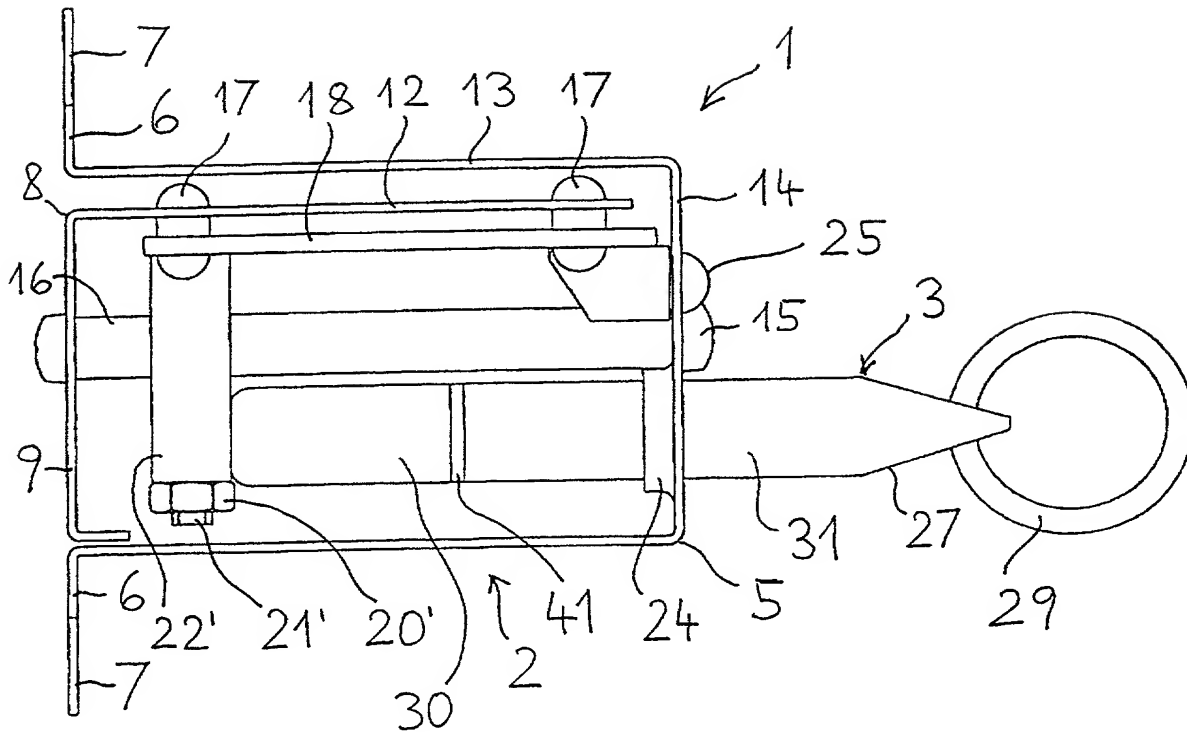


FIG 5



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Fig. 6



COMBINED DECLARATION AND POWER OF ATTORNEY

(Original, Design, National Stage of PCT, Supplemental)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type: (check one applicable item below)

- ☐ original
- ☐ design
- ☐ supplemental
- ☒ National Stage of PCT
- ☐ divisional (see added page)
- ☐ continuation (see added page)
- ☐ continuation-in-part (see added page)

INVENTORSHIP IDENTIFICATION

My/our residence, post office address and citizenship is/are as stated below next to my/our name. I/We believe that the named inventor or inventors listed below is/are the original and first inventor or inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

A method and an apparatus for identification and control of handling of keys ~~and the like~~

SPECIFICATION IDENTIFICATION

The specification of which: (complete (a), (b) or (c))

- (a) ☐ is attached hereto.
- (b) ☐ was filed on _____ as
☐ Serial No. _____ or
☐ Express Mail No. _____ as Serial No. (not yet known) and was
amended on _____ (if applicable).
- (c) ☒ was described and claimed in PCT International Application No. PCT/SE00/01764
filed on 13 September 2000 and as amended under PCT Article 19 on
_____ (if any).

POWER OF ATTORNEY

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name(s) and registration number(s))

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